

REMARKS

The Response is submitted in response to the final Office Action dated June 21, 2005. Claims 1, 8, 9, 17 and 20 are pending in this application. Claims 2-7, 10-16 and 18-19 were previously withdrawn. In the Office Action, Claims 1, 5, 8-9, 17 and 20 are rejected under 35 U.S.C. §112, first paragraph and second paragraph, Claims 1, 5 and 17 are rejected under 35 U.S.C. 102(b) and Claims 1, 5, 8-9, 17 and 20 are rejected under 35 U.S.C. §103(a). In view of the response set forth below, Applicants respectfully submit that the Patent Office should withdraw these rejections.

In the Office Action, Claims 1, 5, 8-9, 17 and 20 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description. Claims 1, 5, 8-9, 17 and 20 are also rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Patent Office alleges that the specification as-filed contains subject matter not sufficiently described to enable one skilled in the art or reasonably convey to one skilled in the art that the inventors, at the time of filing, had possession of the claimed invention.

To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. An applicant shows possession of the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams and formulas that fully set forth the claimed limitation.

Applicants respectfully submit that the claims contain subject matter that was described in the specification in such a way as to reasonably convey to one skilled in that art that the inventors, at the time the application was filed, had possession of the claimed invention. With respect to Claims 1, 5, 8-9, 17 and 20, Applicants submit that (1) the Maillard reaction is a well-known reaction to persons having ordinary skill in that art, (2) the operating conditions necessary to react one or more disclosed peptides together with at least one reducing sugar to a Maillard reaction are also well known to persons having ordinary skill in the art, (3) aroma/smell is a key sensory identifier in determining flavor profiles and (4) sensory evaluation of 6 samples at a time is necessary to avoid olfactory fatigue.

The Maillard reaction is a well-known reaction. Furthermore, the standard operating conditions required to conduct a Maillard reaction are also well known to persons skilled in the

art. The specification provides a *model reaction* that includes an example mass of dipeptide mixture and reducing sugar, the pre-heating temperature for propylene glycol, the 0.01N NaOH to adjust properly the mixture to the target pH range, the optimal heating time (60 minutes), the cooled temperature and the storage temperature. See, specification, page 11, lines 25-30. With that information, knowledge of the Maillard reaction as well as its standard operating conditions, one skilled in the art could produce, with regular experimentation, the appropriate process reactions with the noted flavor profiles. Moreover, the inventive aspect of the claimed invention is not any novel processing conditions using the Maillard reaction, but rather the isolation of the noted various peptides in cocoa beans, which in turn give rise to desired flavor profiles.

Performing a proper sensory evaluation of aroma (smell), a key sensory identifier in determining flavor profiles, requires evaluating a limited number of samples at one time in order to prevent olfactory fatigue. In evaluating flavor, it is standard practice to sample for aroma. Flavor, or "taste", takes into account many sensory stimuli that are just as encompassing as the tongue. Aroma is that key "other" stimuli that is often just as important as gustation (mouth assessment). Especially in the case of concentrated flavors where actual tasting could immediately fatigue the senses, it is standard practice to allow aroma to serve as a key and, at times, primary indicator of the flavor profile. Such is the case with Applicants' claimed invention.

Regarding the enablement requirement, Applicants respectfully submit that one having ordinary skill in the art would be able to make/use the invention without undue experimentation based on the Applicants' specification. As stated above with regard to the written description, the examples disclosed in the specification provide adequate guidance to one of ordinary skill in the art on how to make and use the invention to isolate the disclosed dipeptides from cocoa beans and to react those dipeptides together with a reducing sugar(s) to a Maillard reaction to form the flavor active compounds. Besides the fact that the Maillard reaction is well known to those of ordinary skill in the art, the information provided in the *model reaction* together with the well-known standard operating conditions required to conduct a Maillard reaction allows one skilled in the art to make or use the invention. Furthermore, aroma does serve as a key determinant of flavor and effectively does so when sensory technicians limit sample numbers to prevent panelists from getting sensory fatigue. For these reasons, Applicants used aroma as their key

indicator of flavor in the claimed invention and limited the number of samples per sitting in order to get an accurate reading of the flavor profile.

As further evidence, Applicants have submitted an affidavit under 37 C.F.R. §1.132 ("*Affidavit*" attached as Exhibit A). Applicants properly obviate the 35 U.S.C. §112, first paragraph, rejections on the pending claims with respect to the written description and enablement requirements. In this regard, the *Affidavit* sufficiently and properly evidences that one having ordinary skill in the art would understand that the Applicants, at the time of filing, had possession of the claimed invention and would be able to make and use the claimed invention as disclosed. For example, the *Affidavit* shows that the specification provides adequate guidance to one of ordinary skill in the art how to make and use the invention to isolate the disclosed dipeptides from cocoa beans and to react those dipeptides together with a reducing sugar(s) to a Maillard reaction to form the flavor active compounds. Furthermore, the *Affidavit* shows that one having ordinary skill in the art would understand that aroma/smell is a key sensory identifier in determining flavor profiles and that sensory evaluation of 6 samples at a time is necessary to avoid olfactory fatigue.

Based on at least these noted reasons, Applicants believe that Claims 1, 5, 8-9, 17 and 20 fully comply with 35 U.S.C. §112, first paragraph. Accordingly, Applicants respectfully request that the rejections to Claims 1, 5, 8-9, 17 and 20 under 35 U.S.C., first paragraph, be withdrawn.

In the Office Action, Claims 1, 5, 8-9, 17 and 20 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

First, Applicants submit to previously amending the claims as directed by the Patent Office, thus addressing the "reacting" and "a reducing sugar to a Maillard reaction" suggested amendments by the Patent Office. Second, "flavor active compound," as used in this application, refers clearly to compounds obtained by reacting one or more peptides, selected from a group disclosed in the claimed invention, together with at least one reducing sugar to a Maillard reaction under conditions, both provided in the specification and those known to one having ordinary skill in the art, sufficient to form the compound. Furthermore, the claimed invention's flavor profile can be a function of both taste and aroma, as both are key identifiers of flavor profile. See, *Affidavit*. Third, as discussed previously, Applicants submit that "conditions

sufficient to form the flavor active compound” are not vague and indefinite. Using both the conditions disclosed in the specification and the well-known knowledge of the Maillard reaction as well as its standard operating conditions, one skilled in the art could produce, with regular experimentation, the appropriate process reactions with the noted flavor profiles.

Based on at least these noted reasons, Applicants believe that Claims 1, 5, 8-9, 17 and 20 fully comply with 35 U.S.C. §112, second paragraph. Accordingly, Applicants respectfully request that the rejections to Claims 1, 5, 8-9, 17 and 20 under 35 U.S.C., second paragraph, be withdrawn.

In the Office Action, Claims 1, 5 and 17 are rejected under 35 U.S.C. §102(b) as being anticipated by Otagiri, et al., Studies on a Model of Bitter Peptide Including Arginine, Proline, and Phenylalanine Residue. I. Bitter Taste of Di- and Tripeptides and Bitterness Increase of the Model Peptides by Extension of the Peptide Chain, Agric. Biol. Chem., 1985, Vol. 49, Iss. 4, pp. 1019-1026 (“*Otagiri*”). Applicants believe this rejection is improper and respectfully traverse it for at least the reasons set forth below.

Independent Claims 1 and 17 recite, in part, a flavor active compound obtained by reacting Arg-Phe with fructose in a Maillard reaction under conditions sufficient to form the flavor active compound. In contrast, *Otagiri* fails to disclose reacting the Arg-Phe dipeptide with a reducing sugar under Maillard reaction conditions. The *Affidavit* sufficiently and properly evidences that (1) *Otagiri* is only concerned with the bitter taste of the synthetic peptides that were synthesized by conventional methods, (2) there is no disclosure in *Otagiri* that the Arg-Phe has undergone a Maillard reaction in the presence of a reducing sugar nor does *Otagiri* make any mention of a bread, caramel flavor and (3) the use of the Maillard reaction is essential in producing the bread, caramel notes in the resultant Arg-Phe compound. Consequently, in addressing the Patent Office’s use of *In re Thorpe*, the Arg-Phe based reaction flavor of the claimed invention is a different compound than the Arg-Phe disclosed in *Otagiri* that has not undergone such a reaction.

For the reasons discussed above, Applicants respectfully submit that Claims 1, 5 and 17 are novel, nonobvious and distinguishable from the cited references. Accordingly, Applicants respectfully request that the rejections of Claims 1, 5 and 17 under U.S.C. §102(e) be withdrawn.

In the Office Action, Claims 1, 5, 8-9, 17 and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Otagiri* in view of US Patent No. 5,753,296 to Girsh ("*Girsh*"). Applicants believe this rejection is improper and respectfully traverse it for at least the reasons set forth below.

Applicants respectfully submit that there is no motivation to combine the cited references to arrive at the claimed invention. The *Affidavit* sufficiently and properly evidences that *Girsh* only teaches a reaction between lactose and cocoa powder protein with a supercritical fluid. By using the vague term "protein", *Girsh* encompasses the full range of 20 amino acids. As a result, it is possible to make 400 (202) different dipeptides, 64 million (206) hexapeptides and 1052 (2040) different proteins that contain only 40 amino acids. With these millions of possible peptides in hand, *Girsh* provides no guidance and teaching that would lead a person of ordinary skill in the art to select the dipeptides of the claimed invention and react them with a reducing sugar under Maillard conditions. Furthermore, as discussed above, *Otagiri* fails to disclose reacting any dipeptide with a reducing sugar under Maillard reaction conditions. Moreover, of the dipeptides disclosed in *Otagiri*, only one of the 49 is of any use in the claimed invention. Because of the vague nature of *Girsh* and *Otagiri*'s failure to disclose essential aspects of the reaction needed to form Applicants' unique claimed invention, there is no motivation to combine the teachings of the cited references to disclose all the elements of the present claims. Thus, the cited references fail to render the claimed subject matter obvious for at least these reasons.

In the Office Action, Claims 1, 5, 8-9, 17 and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Otagiri* in view of Yu-Chiang Oh, Flavor Chemistry of the Maillard Reaction of Dipeptides, Rutgers The State University of New Jersey – New Brunswick, 1992, pp. 1-154 ("*Oh*"). Applicants believe this rejection is improper and respectfully traverse it for at least the reasons set forth below.

Applicants respectfully submit that there is no motivation to combine the cited references to arrive at the claimed invention. *Oh* is no more than a generic teaching of reacting dipeptides. The Patent Office states the same. See, Office Action, page 19, lines 3-11. As a result, *Oh*, like *Girsh*, encompasses the full range of amino acids and their resulting peptides discussed above. See *Affidavit*. With these millions of possible peptides in hand, *Oh* provides no guidance and teaching that would lead a person of ordinary skill in the art to select the dipeptides of the

claimed invention and react them with a reducing sugar under Maillard conditions. Furthermore, of the example peptides discussed in *Oh* in relation to the Maillard reaction, none match the Arg-Phe dipeptide or any other dipeptides cited in the rejected claims. See, *Oh*, page 45, lines 6-11. Finally, neither *Oh* nor *Otagiri* mention the production of a flavour, for example, that has all the components of a typical chocolate aroma and an appropriate body. Because of the vague nature of *Girsh* and *Otagiri's* deficiencies discussed above, there is no motivation to combine the teachings of the cited references to disclose all the elements of the present claims. Thus, the cited references fail to render the claimed subject matter obvious for at least these reasons.

Accordingly, Applicants respectfully request that the rejections of Claims 1, 5, 8-9, 17 and 20 under U.S.C. §103 be withdrawn.

For the foregoing reasons, Applicants respectfully request reconsideration of the above-identified patent application and earnestly solicit an early allowance of same.

Respectfully submitted,

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